

IN THE CLAIMS:

Claim 1 (Currently Amended) A closure for setting engagement with a structural member and comprising:

- (a) a substantially cylindrical body having an outer cylindrical surface relative to a central closure axis;
- (b) a substantially continuous guide and advancement flange extending helically about said outer cylindrical surface and being sized and shaped radially to interlock with a mating guide and advancement flange on a receiving structure; said flange having a leading surface and a trailing surface relative to a direction of forward advancement;
- (c) at least one of said leading surface or said trailing surface being compound in contour and including an inward facing anti-splay surface component facing generally toward said closure axis;
- (d) said body having a multi-surface aperture formed therein that is aligned with said closure axis and that is elongated along said closure axis, said aperture opening onto a trailing surface of said body and including a plurality of circumferentially spaced, centrally facing surfaces extending substantially parallel to said closure axis that are aligned to form a removal socket adapted to receive a removal tool; and

- (e) a break off installation head.

Claim 2 (Original) The closure as set forth in Claim 1 wherein said multi-surfaced aperture includes:

- (a) a multi-lobular aperture elongated along said closure axis, said aperture including a plurality of circumferentially spaced lobes extending substantially parallel to said closure axis and facing generally toward said closure axis.

Claim 3 (Original) The closure as set forth in Claim 2 wherein:

- (a) said lobes circumferentially alternate with grooves extending substantially parallel to said closure axis.

Claim 4 (Original) The closure as set forth in Claim 1 and including:

- (a) said installation head is shaped to enable non-slip engagement of said installation head by an installation tool; and
- (b) said installation head being connected to said closure by a breakaway region formed in such a manner that said breakaway region fails in response to a selected level of torque between said installation head and said closure to enable separation of said installation head

from said body and to expose said removal socket.

Claim 5 (Original) The closure as set forth in Claim 1 and including:

- (a) said body having a forward end relative to said forward advancement direction; and
- (b) said body having a V-shaped set ring formed on said forward end to enhance setting engagement of said body into a surface of a structural member.

Claim 6 (Original) The closure as set forth in Claim 1 in combination with a bone implant screw adapted for connection to a bone fixation structural member, said bone implant screw including:

- (a) a threaded shank adapted for threaded implanting into a bone;
- (b) an open head formed by a pair of spaced apart arms having mutually facing channel surfaces defining a structural member receiving channel to receive a bone fixation structural member; and
- (c) said mutually facing channel surfaces having respective mating guide and advancement structures formed therein which are compatible with and rotatably mateable with said guide and advancement flange to enable guiding and

advancement of said body into said channel to thereby clamp said bone fixation structural member therein and to interlock said body and arms.

Claim 7 (Original) The closure and bone implant screw combination as set forth in Claim 6 wherein:

- (a) said mating guide and advancement structures of said bone implant screw include an outward anti-splay surface component which cooperates with said inward anti-splay surface component of said closure in such a manner as to resist a tendency of said arms to splay in reaction to torquing said closure into engagement with said bone fixation structural member.

Claim 8 (Canceled)

Claim 9 (Currently Amended) A closure for setting engagement with a structural member and comprising:

- (a) a substantially cylindrical body having an outer cylindrical surface relative to a central closure axis;
- (b) a guide and advancement flange extending helically about said outer cylindrical surface; said guide and advancement flange being sized and shaped to radially interlock with a mating guide and advancement flange on

- a receiving bone screw; said flange having a trailing surface relative to said forward advancement direction;
- (c) said trailing surface being compound in contour and including an inward facing anti-splay surface component facing generally toward said closure axis;
- (d) said body having a multi-lobular aperture formed therein which is aligned on and elongated along said closure axis, said aperture including a plurality of circumferentially spaced lobes extending substantially parallel to said closure axis and said lobes circumferentially alternating with bore grooves extending substantially parallel to said closure axis to form a removal socket adapted to receive a removal tool; and
- (e) a break off installation head.

Claim 10 (Original) The closure as set forth in Claim 9 and including:

- (a) said installation head being shaped to enable non-slip engagement of said installation head by an installation tool; and
- (b) said installation head being connected to said closure by a breakaway region formed in such a manner that said breakaway region fails in response to a selected level

of torque between said installation head and said closure to enable separation of said installation head from said closure and to expose said aperture socket.

Claim 11 (Original) The closure as set forth in Claim 9 and including:

- (a) said body having a forward end relative to a direction of forward advancement; and
- (b) said body having a V-shaped set ring formed on said forward end to enhance setting engagement of said body into a surface of a structural member.

Claim 12 (Original) The closure as set forth in Claim 9 in combination with a bone implant screw adapted for connection to a bone fixation structural member, said bone implant screw including:

- (a) a threaded shank adapted for threaded implanting into a bone;
- (b) an open head formed by a pair of spaced apart arms having mutually facing channel surfaces defining a structural member receiving channel to receive a bone fixation structural member; and
- (c) said mutually facing channel surfaces having an internal mating guide and advancement structures formed

therein which are compatible for slidably mating with said flange upon rotation of said body to enable advancement of said body into said channel to thereby clamp said bone fixation structural member therein and to interlock said body to said arms to resist splaying of said arms.

Claim 13 (Original) The closure and bone implant screw combination as set forth in Claim 12 wherein:

- (a) said mating guide and advancement structures of said bone implant screw include an outward anti-splay surface component which cooperates with said inward anti-splay surface component of said flange in such a manner as to resist splaying of said arms.

Claim 14 (Canceled)

Claim 15 (Previously Presented) A In a closure for setting engagement with a structural member and including a substantially cylindrical body having an outer cylindrical surface relative to a central closure axis, the improvement comprising:

- (a) said closure having a flange that has a leading surface and a trailing surface with at least one of said leading surface and said trailing surface being compound in contour so as to form a substantially continuous guide and advancement flange extending helically about said outer surface and including an inward facing anti-splay surface component facing generally toward said closure axis; said flange being sized and shaped to radially interlock with a mating guide and advancement flange on a receiving structure;
- (b) said body having a multi-surfaced aperture formed therein which is located and elongated along said closure axis, said aperture including a plurality of circumferentially spaced surfaces extending substantially parallel to said closure axis so as to form a removal socket adapted to receive a removal tool; and
- (c) a break off installation head.



Claim 16 (Original) The closure as set forth in Claim 15 wherein said multi-surfaced aperture is:

- (a) a multi-lobular aperture elongated along said closure axis, said aperture including a plurality of circumferentially spaced lobes extending substantially parallel to said closure axis and said lobes circumferentially alternating with grooves extending substantially parallel to said closure axis.

Claim 17 (Original) The closure as set forth in Claim 15 and including:

- (a) said installation head being shaped to enable non-slip engagement of said installation head by an installation tool; and
- (b) said installation head being connected to said body by a breakaway region formed in such a manner that said breakaway region fails in response to a selected level of torque between said installation head and said body to enable separation of said installation head from said body.

Claim 18 (Previously presented) The closure as set forth in Claim 15 and including:

- (a) said body having a forward end relative to said direction of forward advancement; and
- (b) said body having a V-shaped set ring formed on said forward end to enhance setting engagement of said body into a surface of the structural member.

Claim 19 (Original) The closure as set forth in Claim 15 in combination with a bone implant screw adapted for connection to a bone fixation structural member, said bone implant screw including:

- (a) a threaded shank adapted for threaded implanting into a bone;
- (b) an open head formed by a pair of spaced apart arms having mutually facing channel surfaces defining a structural member receiving channel to receive a bone fixation structural member;
- (c) said mutually facing channel surfaces having respective mating guide and advancement structures formed therein which are compatible to allow rotational mating with said guide and advancement flange to enable guiding and advancement of said body into said channel to thereby clamp said bone fixation structural member therein and

to interlock said arms to said body to resist splaying of said arms; and

- (d) said mating guide and advancement structures of said bone implant screw including an outward anti-splay surface component which cooperates with said inward anti-splay surface component of said flange in such a manner as to resist a tendency of said arms to splay in reaction to torquing and other forces.

Claim 20 (Canceled)

Claim 21 (New) In combination a bone implant screw adapted for connection to a bone fixation structural member and a closure for setting engagement with the structural member; said closure comprising:

- (a) a substantially cylindrical body having an outer cylindrical surface relative to a central closure axis;
- (b) a substantially continuous guide and advancement flange extending helically about said outer cylindrical surface and being sized and shaped to interlock with a mating guide and advancement flange on a receiving structure; said flange having a leading surface and a trailing surface relative to a direction of forward advancement;

- (c) at least one of said leading surface and said trailing surface being compound in contour and including an inward facing anti-splay surface component facing generally toward said closure axis;
- (d) said body having a multi-surface aperture formed therein that is aligned with said closure axis and that is elongated along said closure axis, said aperture opening onto a trailing surface of said body and including a plurality of circumferentially spaced, centrally facing surfaces extending substantially parallel to said closure axis that are aligned to form a removal socket adapted to receive a removal tool;
- (e) a break off installation head; said bone screw comprising:
- (f) a threaded shank adapted for threaded implanting into a bone;
- (g) an open head formed by a pair of spaced apart arms having mutually facing channel surfaces defining a structural member receiving channel to receive a bone fixation structural member;
- (h) said mutually facing channel surfaces having respective mating guide and advancement structures formed therein which are compatible with and rotatably mateable with said guide and advancement flange to enable guiding and

advancement of said body into said channel to thereby clamp said bone fixation structural member therein and to interlock said body and arms; and further wherein:

- (i) said mating guide and advancement structures of said bone implant screw each includes an outward anti-splay surface component which cooperates with said inward anti-splay surface component of said closure in such a manner as to resist a tendency of said arms to splay in reaction to torquing said closure into engagement with said bone fixation structural member;
- (j) said guide and advancement flange has a relatively enlarged region near an outer periphery thereof that forms said inward anti-splay surface component;
- (k) said mating guide and advancement structures are contoured in a complementary manner to said guide and advancement flange to form said outward anti-splay surface component; and
- (l) said inward anti-splay surface component engages said outward anti-splay surface component when said closure is guided and advanced into said open screw head of said bone implant screw so as to interlock said body to said arms to resist radially outward splaying movement of said arms.

Claim 22 (New) The combination of a bone implant screw adapted for connection to a bone fixation structural member and a closure for setting engagement with the structural member; said closure comprising:

- (a) a substantially cylindrical body having an outer cylindrical surface relative to a central closure axis;
- (b) a guide and advancement flange extending helically about said outer cylindrical surface; said guide and advancement flange being sized and shaped to interlock with a mating guide and advancement flange on a receiving bone screw; said flange having a trailing surface relative to said forward advancement direction;
- (c) said trailing surface being compound in contour and including an inward facing anti-splay surface component facing generally toward said closure axis;
- (d) said body having a multi-lobular aperture formed therein which is aligned on and elongated along said closure axis, said aperture including a plurality of circumferentially spaced lobes extending substantially parallel to said closure axis and said lobes circumferentially alternating with bore grooves extending substantially parallel to said closure axis to form a removal socket adapted to receive a removal tool;

- (e) a break off installation head; said bone screw comprising:
- (f) a threaded shank adapted for threaded implanting into a bone;
- (g) an open head formed by a pair of spaced apart arms having mutually facing channel surfaces defining a structural member receiving channel to receive a bone fixation structural member;
- (h) said mutually facing channel surfaces each having an internal mating guide and advancement structure formed therein which is compatible for slidably mating with said flange upon rotation of said body to enable advancement of said body into said channel to thereby clamp said bone fixation structural member therein and to interlock said body to said arms to resist splaying of said arms; and further wherein:
- (i) said mating guide and advancement structures of said bone implant screw each includes an outward anti-splay surface component which cooperate with said inward anti-splay surface component of said flange in such a manner as to resist splaying of said arms;
- (j) said flange has a relatively enlarged region near an outer periphery thereof that forms said inward anti-splay surface component;

- (k) said mating guide and advancement structures are contoured in a complementary manner to said flange to form said outward anti-splay surface component; and
- (l) said inward anti-splay surface component engages said outward anti-splay surface component when said closure is rotated into said open screw head of said bone implant screw.

Claim 23 (New) A combination of a bone implant screw adapted for connection to a bone fixation structural member and a closure for setting engagement with the structural member; said closure including a substantially cylindrical body having an outer cylindrical surface relative to a central closure axis, the improvement comprising:

- (a) said closure having a flange that has a leading surface and a trailing surface with at least one of said leading surface and said trailing surface being compound in contour so as to form a substantially continuous guide and advancement flange extending helically about said outer surface and including an inward facing anti-splay surface component facing generally toward said closure axis; said flange being sized and shaped to interlock with a mating guide and advancement flange on a receiving structure;



- (b) said body having a multi-surfaced aperture formed therein which is located and elongated along said closure axis, said aperture including a plurality of circumferentially spaced surfaces extending substantially parallel to said closure axis so as to form a removal socket adapted to receive a removal tool;
- (c) a break off installation head; and said bone screw comprising:
- (d) a threaded shank adapted for threaded implanting into a bone;
- (e) an open head formed by a pair of spaced apart arms having mutually facing channel surfaces defining a structural member receiving channel to receive a bone fixation structural member;
- (f) said mutually facing channel surfaces having respective mating guide and advancement structures formed therein which are compatible to allow rotational mating with said guide and advancement flange to enable guiding and advancement of said body into said channel to thereby clamp said bone fixation structural member therein and to interlock said arms to said body to resist splaying of said arms;
- (g) said mating guide and advancement structures of said

bone implant screw each including an outward anti-splay surface component which cooperates with said inward anti-splay surface component of said flange in such a manner as to resist a tendency of said arms to splay in reaction to torquing and other forces;

- (h) said guide and advancement flange having a relatively enlarged region near an outer periphery thereof that forms said inward anti-splay surface component;
- (i) said mating guide and advancement structures being contoured in a complementary manner to said guide and advancement flange to form said outward anti-splay surface component; and
- (j) said inward anti-splay surface component engaging said outward anti-splay surface component when said closure is guided and advanced into said open screw head of said bone implant screw so as to radially interlock.